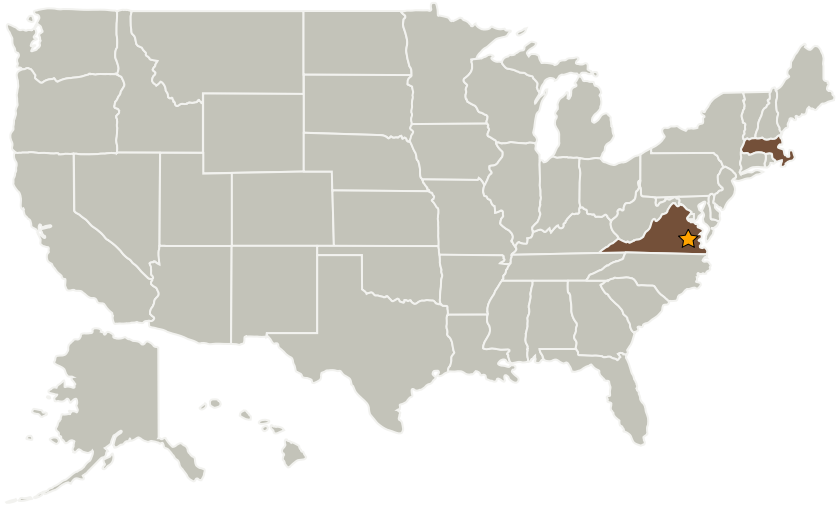
Efficient 3-D Ladar Source, Phase II

Completed Technology Project (2009 - 2011)

Project Introduction

In the Phase I program we demonstrated the efficacy of the proposed innovation by experimentally demonstrating an improvement in slope efficiency of ~11% by changing the pump wavelength from 806-nm to the 863-nm, which directly pumps the upper laser level of the 1047-nm laser transition in Nd:YLF. This level of improvement in efficiency is significant for space-based systems where overall efficiency is of great value. In addition to the optical-to-optical efficiency improvement, there is a lower heat load in the gain medium reducing the cooling requirements. In this work we take advantage of our broad experience with Nd:YLF and the unique advantages of the MPS(TM) design to develop an all-solid-state, compact, conductively-cooled laser system operating in 1-μm region with an output energy of nominally 30 mJ and a pulse repetition frequency (PRF) of 30 Hz. The specific goal of this project will be to produce a laser design that is suitable for use in 3-D flash ladar systems housed in spacecraft and used for automated landing and hazard avoidance in difficult terrain and to deliver to NASA LaRC a working prototype of this laser design that is suitable for use in terrestrial testing of flash ladar systems when it is integrated with a suitable ladar receiver.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Q-Peak, Inc.	Supporting Organization	Industry	Bedford, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Transitions

January 2009: Project Start

April 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.2 Heat Sources